HYPERTENSION

ASSOCIATION OF HYPERTENSION WITH CENTRAL OBESITY IN LOW TO MIDDLE SOCIOECONOMIC POPULATION

ORIGINAL
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ABSTRACT…Objective: To evaluate association of hypertension with central obesity in low to middle socioeconomic population. **Study design:** Descriptive study. **Setting:** OPD, Filter Clinic. Pakistan Institute of Medical Sciences. Islamabad. **Period:** June to September 2008. **Methods:** This study was carried out on 85 patients with history of hypertension. Out of total patients, 27 were males and 58 were females. The ages of the all patients were between 20 to 70 years. Parameters recorded included history, blood pressure, weight, height, waist circumference and hip circumference. The secondary causes were ruled out on the basis of history and physical examination. Data and results were analyzed in SPSS. **Results:** Out of 85 patients, 74 including 21 males and 53 females had increased Waist Hip Ratio (WHR), 66 including 14 males and 61 females had increased Waist Circumference (WC), while the Body Mass Index (BMI) of 33 including 6 males & 27 females were found obese. It also showed that the females are more prone to obesity. The age group between 41-60 years was most effected. The results indicates that waist hip ratio is the most common indicator of obesity in patients with essential hypertension as compare to waist circumference and body mass index. **Conclusions:** Hypertension is associated with central obesity in low to middle socioeconomic status.

Key words: Obesity, Hypertension, BMI, Waist hip ratio, Waist circumference

INTRODUCTION

For the past two decades, we have been living through an epidemic of obesity[1]. The prevalence of obesity has more than doubled in adults and has risen by a factor of more than 3 in children. This escalation in obesity is a time bomb for the future risk of diabetes and other illnesses and for the attendant costs[2]. Overweight (BMI ⩾ 25) or obesity (BMI ⩾ 30) now affects almost two thirds of Americans. The National Health and Nutrition Examination Survey, 2003 to 2004, showed prevalence of obesity in U.S. men and women of 31.1% and 33.2%, respectively, with particularly high rates among non-Hispanic black Americans and Mexican Americans[3]. Overweight and obesity are associated with multiple coexisting conditions, including hypertension, glucose intolerance, dyslipidemia, and obstructive sleep apnea. Moreover, obesity is associated with an increased risk of death from cardiovascular disease, diabetes, kidney disease, and obesity-related cancers (colon, breast, esophageal, uterine, ovarian, kidney, and pancreatic)[4].

Using the third National Health and Nutrition Examination Survey data in 9019 whites, a study recently reported that WC is more closely linked to cardiovascular disease risk factors than is BMI[5]. Although it is difficult to define the "ideal" body weight, a BMI of 30 or more is associated with increased risk of death from all causes and death from cardiovascular disease. Waist circumference is an independent predictor of these outcomes and should be measured routinely. A reduction in weight as small as 5 to 10% may be sufficient for favorable modification of waist circumference, blood pressure, circulating cytokines, and, variably, fasting levels of glucose, triglycerides, and HDL cholesterol[6].

This study was planned to assess the central obesity which is the clinical parameter of metabolic syndrome with hypertension.

MATERIAL AND METHODS

This study was conducted in the Outpatient department of the Pakistan Institute of Medical Sciences, Islamabad from June to September 2008. Eighty five patients with history of hypertension were included. After informed consent, detailed history and physical examination carried out including blood pressure measurement.

Height and weight of patients were recorded. BMI

calculated after entering data. Waist circumference and waist hip ratio calculated with the help of measuring tape. BMI was calculated as weight in kilograms divided by the square of height in meters. Waist circumference was calculated as an average of 2 measurements taken after inspiration and expiration at the mid-point of the lowest rib and iliac crest.

Waist-Hip ratio was defined as waist-girth divided by the hip-circumference measured at greater trochanter. WHO criteria was used for BMI, waist, circumference and waist hip ratio.

WHO criteria for BMI

Normal	18.5 - 24.9
Pre-obese	25-29.9
Obese class I	30-34.9
Obese class II	35-40
Obese class III	>40

WHO criteria for Waist Circumference

Sex	Substantial risk
Men	>102cms (40inch)
Women	>88cms (35inc)

WHO criteria for Waist Hip ratio

Men	0.9
Women	0.85

Three parameters were analyzed and seen with sex and age. Statistical software SPSS-17 was used for data analysis.

RESULTS

In this study of 85 patients were included. Fifty eight females and 27 were males (Table-I). Age range of 20 – 70 years mean age 51.2±10.10. Mean blood pressure (B.P) was 160.76±18.56/101.65±7.65. According to waist hip ratio 74 patients were found to be obese, while waist circumference showed 65 obese patients. (Table-II) and BMI 33 patients were obese and 52 were non obese (Table-III). Non obese patients waist hip ratio of 11 and waist circumference 20 (Table-IV). The waist hip ratio, waist circumference and BMI in obese and non obese patients shown in Fig-I and Fig- II. Distribution of sex in according to three parameters and total no. of patients shown in Fig-III.

Table-I. Obese hypertensive

Age (yrs)	Female (58)	Male (27)
20-40	11	06
41-60	40	15
61-70	07	06

Table-II. Obese hypertensive

Age (yrs)	Waist; ratio (74)		Waist (65)	
	Female (53)	Male (21)	Female (51)	Male (14)
20-40	10	05	06	03
41-60	36	11	38	07
61-70	07	05	07	04

DISCUSSION

Obesity is a common problem in much of the western world today in that is linked directly with several disease processes, notably, hypertension. It is becoming clear that the adipocyte is not merely an inert organ for storage of energy but that it also secretes a host of factors that interact with each other and may result in elevated blood pressure. Of particular importance is the putative role of leptin in the causation of hypertension via an activation of the sympathetic nervous system and a direct effect on the kidneys, resulting in increased sodium reabsorption leading to hypertension. Obesity per se may have structural effects on the kidneys that may perpetuate hypertension, leading to an increased incidence of end-stage renal disease that results in further hypertension. Adipose tissue may elaborate angiotensin from its own local renin-angiotensin system. The distribution of body fat is considered important in the genesis of the obesity-hypertension syndrome, with a predominantly central distribution being particularly ominous. Weight loss is the cornerstone in the management of the obesity-hypertension syndrome. It may be achieved with diet, exercise, medications, and a combination of these measures. Anti-obesity medications that are currently undergoing clinical trials may play a promising role in the management of obesity and may also result in lowering

Table-III. Obese and non obese hypertensive patients

	BMI (27+6=33)									
	Female (58)					Male (27)				
Age (yrs)	Normal 18.5-24.9 (14)	Pre-obese 25-29.9 (17)	Obese class I 30-34.9 (7)	Obese class II 35-40 (7)	Obese class III >40 (1)	Normal 18.5-24.9 (8)	Pre-obese 25-29.9 (13)	Obese class I 30-34.9 (4)	Obese class II 35-40 (2)	Obese class III >40 (0)
20-40	6	3	-	2	-	2	2	2	-	-
41-60	6	11	17	5	1	4	9	1	1	-
61-70	2	3	2	-	-	2	2	1	1	-

Table-IV. Non obese hypertensive patients

Age (yrs)	Waist} ration (11)		Waist (20)	
	Male (6)	Female (5)	Male (13)	Female (7)
20-40	1	1	3	5
41-60	4	4	8	2
61-70	1	-	2	-

Fig-1. Comparison of waist hip ratio, waist circumference and BMI in obese hypertensive patients

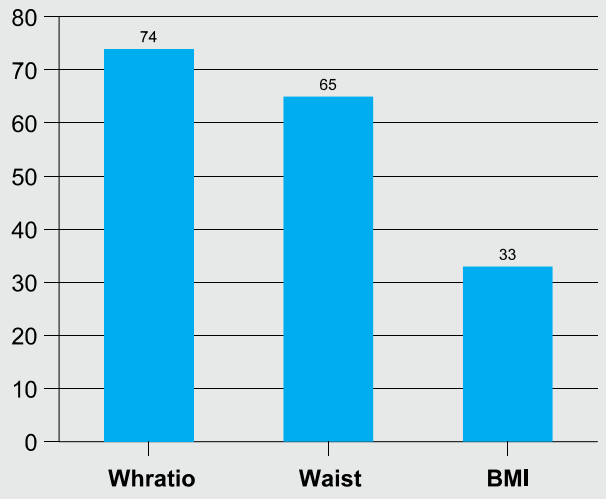
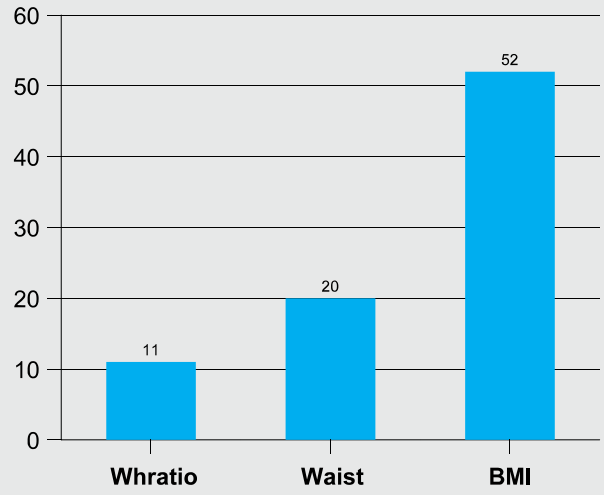


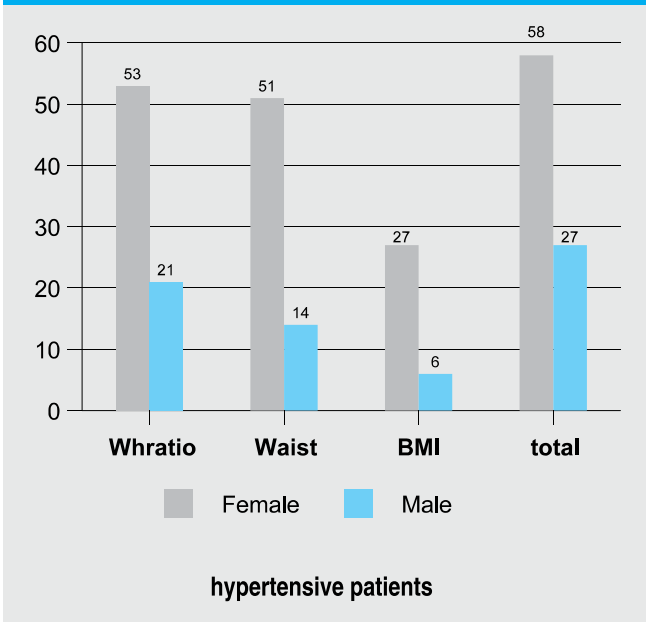
Fig-2. Comparison of waist hip ratio, waist circumference in non obese hypertensive patients



of blood pressure[7].

Hypertension, a condition developed as a result of high blood pressure is strongly correlated with body mass index (BMI). Obesity was noted to be a single best predictor of hypertension incidence, and was regarded as a major controllable contributor to hypertension. Overweight and obesity is conveniently determined from BMI. A study was conducted in Khyber Medical College (KMC) Peshawar to investigate the relation of hypertension with BMI and age. The results show a consistence relation between BMI and hypertension

Fig-3. Distribution of sex in obese



within age groups in both male and females. The figures exhibited a relation of age with BMI and hypertension in both males and females subjects. The results showed a higher trend of hypertension with increasing BMI. In young females it was noted that with a shift from normal BMI the incidence of hypertension was very high[8].

The prevalence of Hypertension in Metroville was high. It showed a quantitative relationship to increasing age and BMI. Hypertension and obesity were the major public health problems in the lower middle class community of Metroville. It is recommended that awareness should be increased and preventive measures implemented[9].

Incidence and trends in incidence of definite hypertension were analyzed based on 30 years follow-up of 5,209 subjects in the Framingham Heart Study cohort. Based on pooling of 15 two-year periods, hypertension incidence per biennium increased with age in men from 3.3 per cent at ages 30-39 to 6.2 per cent at ages 70-79, and in women from 1.5 per cent at ages 30-39 to 8.6 per cent at ages 70-79. No consistent trend in incidence rates was evident for either sex from the 1950s through the 1970s. The proportion of hypertensive subjects receiving anti hypertensive medication has increased since 1954-58 and exceeded 80 per cent for both men and women ages 60-89 years in 1979-81[10].

In one study in Pakistan hypertension was 1.7 (OR 95% CI 1.14, 2.42) times more common among males then females. Males were 1.7 (OR 95% CI 1.06, 2.6) times less likely to have been aware of their hypertension status. Age analysis revealed that the prevalence of hypertension increased with age and hypertensive subjects were 5.6 (OR 95% CI 3.9, 8.1) times more likely to be over 35 years of age. Conclusion: There is a need to control hypertension and prevent its complications through effective community interventions. The survey results indicate high prevalence and poor control of hypertension in the community, but more research is required to understand the reasons behind this phenomena[11].

In a study waist-to-hip ratios foretell more regarding cardiac status (blood pressure and total cholesterol/HDL cholesterol), in these patients than measures of height and weight and lend further support to including the measurement of this ratio as part of the general physical examination[12].

In another study, Waist hip ratio can serve as a sensitive and specific outpatient screening index to detect postmenopausal women with an elevated TC/HDL-C ratio[13].

The prevalence of dyslipidemia in asymptomatic people in this group emphasizes the need for routine health screening for early institution of preventive measures. The correlation with WHR rather than BMI points towards importance of measuring parameters of central obesity rather than body weight and height only[14].

The results in our study indicates that waist hip ratio is the most common indicator of obesity in patients with essential hypertension as compare to waist circumference and body mass index. So waist hip ratio is important predictor in obese hypertensive patients as shown in above studies.

CONCLUSIONS

Hypertension is associated with central obesity in low to middle socioeconomic status.

RECOMMENDATIONS

1. Obese population is at greater risk to develop hypertension so every obese patient should check blood pressure on regular basis.
2. Further studies are required to see complications of obesity.
3. Strategies should be designed for weight reduction to prevent cardiovascular disease.
4. Clinical, epidemiological and physiological work up is necessary to characterize various pathogenic mechanisms involved in the development of hypertension in our society.

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